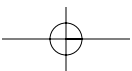
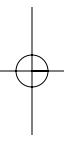
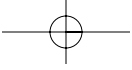


*Mothers & Others  
for a Livable Planet*

Guide to  
**Natural Baby  
Care**



*Mothers & Others  
for a Livable Planet*

Guide to  
**Natural Baby  
Care**

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*Nontoxic and Environmentally Friendly Ways  
to Take Care of Your New Child*

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MINDY PENNYBACKER  
&  
AISHA IKRAMUDDIN

*John Wiley & Sons, Inc.*

New York • Chichester • Weinheim • Brisbane • Singapore • Toronto

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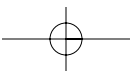
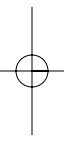
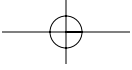
*a c k n o w l e d g m e n t s*

**T**his book would not exist without the generous contributions of time and thought from the following team: Drs. Harvey Karp and Philip Landrigan, our medical advisors; Robert Bernstein and Don Wallace, our publication advisors; Judith McCarthy, Jennifer Campaniolo, and Diane Aronson at John Wiley & Sons; Brook Hersey, Lisa Lefferts, M.S. P.H., Chan McDermott, and Sandra Steingraber, Ph.D., our thoughtful reviewers; Carol Baxter and Joanne Camas, freelance writers and members of Mothers & Others; and Alexis Spakoski, the illustrator who makes us look good.

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Thank you, one and all.

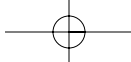


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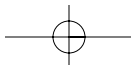
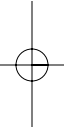
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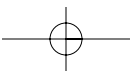
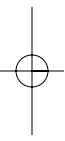
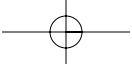
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## f o r e w o r d

One of the first things that all new parents discover is that they must “childproof” their home to make it safe for their babies’ exploring fingers and mouths. As with “childproofing,” “environment proofing” also takes planning and foresight, and *Mothers & Others’ Guide to Natural Baby Care* is the best “environment proofing” advisor I have ever seen!

This book is a commonsense, practical guide that tells us how to protect our children from needless exposure to chemicals and other easily avoided dangers in the household and out of doors. I have been a pediatrician for over twenty years and I know that this book comes at just the right time. Of course, all parents want to give their children the healthiest possible future, but today’s parents are presented with many new choices on how to accomplish this goal. They need a handy source of clear and accurate information to help them do their best. Mothers & Others has provided this in an easy-to-use book that presents step-by-step, practical solutions to many of the everyday questions that new parents have.

New parents find no job more important than taking care of their child. Even well before the due date, many parents give up old, bad habits out of concern for their infant’s health. They begin to eat better and drive more cautiously, start saving money and stop smoking, because they all want the same thing—to start their babies’ lives in the right way by giving them health as well as happiness, security as well as love. Stopping smoking, and keeping cigarette smoke out of your home and car, are among the best things you can do to guard your child’s future health. In much the same way, by avoiding the use of synthetic products that give off toxic and irritating fumes, you improve your indoor air quality and protect the extrasensitive lungs of your newborn. Finding better home and baby care products is easier to do than you may think. For a decade, Mothers & Others for a Livable Planet has been giving parents smart alternatives to dozens of polluting and unhealthy (and just plain dumb) products found in our homes. Now they’ve collected all that information for you in this exceptional book.

It’s normal for expectant parents to feel more than a little awestruck by the new responsibilities they’re facing. There are so many things to learn, from how to swaddle and diaper to how to protect vulnerable babies from

## Foreword

germs, irritants, toxins, and allergens. But at the same time, please remember that you don't have to change the world—or your household—all at once. In fact, this book joins me in advising expectant parents not to embark on major renovations. The stress alone can be bad for a pregnant woman and the baby she's carrying, not to mention the exposure to fumes from fresh paint or pollutants that might be released when old materials are disturbed. This *is* a good time, however, to stop smoking, eat a healthier diet, and begin reading about the surprisingly simple steps you can take to get started with “environment proofing” your home.

If you're pregnant, *Mothers & Others' Guide to Natural Baby Care* contains a chapter on health tips to protect yourself and your unborn baby. It tells you how to check your walls and pipes (and even antique cribs) for lead, the most serious environmental threat to young children. It tells you how to eliminate dust, dust mites, and cockroach droppings, all of which are major causes of asthma, the number one chronic disease of children in the United States. From special mattress covers to the most efficient vacuum cleaners, this book will give you a full listing of the best asthma- and allergy-control products. Between these covers you'll find eco-smart, least-toxic choices of furnishings, from carpet to mattress and crib—not just for baby's room, but for the rest of the house, as well. And once baby arrives, you'll find the chapters on feeding, clothing, and caring for your baby fun to read.

One final thing I like about this book is its friendly, accessible voice. While it states the facts of what you want to avoid and why, it helps you put these risks into the proper perspective. Of course, worrying is built into the parental role, but this guide helps you replace worry with knowledge and action. So, relax—you're not alone. For natural home and baby care questions, you've got the answers in this book.

You can sit down and enjoy reading it, cover to cover, or use it as questions and concerns come up. So, enjoy! And, baby step by baby step, let *Mothers & Others' Guide to Natural Baby Care* help you get your baby off to the best start possible.

—Harvey Karp, M.D.

Fellow of the American Academy of Pediatrics  
Assistant Clinical Professor of Pediatrics,  
University of California at Los Angeles School of Medicine  
Medical Advisor, UCLA Lactation Program  
Practicing Pediatrician, Santa Monica, California

*i n t r o d u c t i o n*

If you're the proud parents of a new baby, or have one on the way, Mothers & Others extends our warmest congratulations to you at this happy time, so full of promise. It's also a time in which this book can be very useful to you. *Mothers & Others' Guide to Natural Baby Care* is designed as a how-to manual to help you provide your baby or young child with the healthiest possible environment in which to grow and thrive. It is intended for expectant and fledgling parents, as well as the parents of older babies and anyone concerned about the effects of environmental toxins, such as lead and carcinogenic chemicals, upon our children's health. As all parents come to learn, we can't protect our children from everything; but there are simple and real things we can do to help them develop healthy, resilient bodies with which to tackle life's challenges.

Until now, very few books have addressed how to reduce babies' and children's exposure to environmental toxins such as lead in old paint and water pipes; fumes from paints, plywood and particleboard, carpets, cleansers, and insecticides; and pesticide residues, hormones, and antibiotics in food and milk. You will find all this information between these covers. In addition, this book discusses acute safety risks (poisonings, falls, choking, accidents) and allergenic hazards such as dust mites. And, while examining immediate risks to your own baby, we also consider collective risks posed to the whole ecosystem by our product choices.

*Mothers & Others' Guide to Natural Baby Care* came about through popular demand. For the past couple of years, our friends and members, most of whom are parents, have been asking us to write an environmental baby care book. Our membership nationwide—30,000 at last count, and growing—receives *The Green Guide*, a monthly consumer newsletter that combines cutting-edge reporting on environmental toxins with information about safer products and practices. Our readers said they wanted to have all that *Green Guide* information, and more, collected in a handbook on baby and child care. They needed one handy volume in which to find everything from nontoxic paints, cleaners, bedding, and carpets to untreated, natural-fiber clothes and diapers. For Mothers & Others, a consumer education organization dedicated to environmental protection for the sake of our children's health, this book was definitely the logical next step.

## Introduction

Mothers & Others has been advocating on behalf of children's health and the environment since our founding in 1989, with the goal of stopping the use of dangerous pesticides.

Partly in response to the consumer protest we spearheaded, Alar, a pesticide widely used on apples and classified as carcinogenic by the federal Environmental Protection Agency, was taken off the market by its maker, Uniroyal, in 1991. Until this time, risk exposures for toxic chemicals had been based on adult tolerance levels only. Mothers & Others was founded on the principle that children are more vulnerable to environmental toxins than are adults, and thus cannot tolerate as much exposure to risky substances. This principle was confirmed by the National Academy of Sciences in 1993 when it reported that federal pesticide standards, then based on adult risk tolerances, provided too little health protection for infants and children. In 1996, the Food Quality Protection Act reaffirmed that message, and, in 1997, the EPA formed a new Office of Children's Health with the goal of establishing new child-specific standards for exposure to contaminants in air, water, and food.

But until an adequate government policy is firmly in place, parents keep asking us what they can do to protect their children in their daily lives. The answer is, a lot. *Mothers & Others' Guide to Natural Baby Care* provides simple, practical steps you can take right now and every day to protect your children's health and reduce your worry load.

The best time to begin is when planning for a new baby, for whom your nesting instinct spurs you to make a safe, clean place. You're going to be acquiring a certain amount of stuff—baby equipment and so forth—no matter what, so why not make it the right stuff? This book will show you how to find environmentally sound, nontoxic products that are competitively priced with conventional ones. But it's also important to remember that, no matter what age your child is, it's never too late to make changes—when a room needs a fresh coat of paint or a floor refinishing, or you're buying a new chair or a bathroom or oven cleaner. Even as the mother of two “middle-aged” children, ages fourteen and eleven, I've learned a lot of useful information from this book. After all, my boys are still growing and developing, and I still worry.

As you leaf through it, you'll notice that this isn't just a nursery book. After all, no baby stays in just one room. We therefore have addressed potential environmental hazards throughout the home, in every room, nook, and cranny. This book contains everything from nontoxic building and decorating materials to water filters, detergents, clothing, personal care products, and toys, and an appendix listing where and how to get it all. In addition to product and company listings, we provide another appendix of resources, including telephone numbers of government organizations and other information services. We cover precautions to be taken in your yard and your neighborhood playground. There's even a chapter covering trips to the seashore

and going on hikes, and a listing of environmentally themed books. This book is meant to be your companion for the long run.

It also contains the most current information you can find to date. Thanks to our patient editors at John Wiley & Sons, Inc., we've been able to update all the facts up to the moment this book went to press, incorporating the very latest scientific studies and environmental and health news. The past five years have seen rapid advances, both in our understanding of chemical threats, such as hormone disruptors, and the availability of alternative products. The names of companies that make or sell these nontoxic, more ecologically sound products are listed throughout each chapter in bold type; their phone numbers and other contact information can be found in Appendix B. Part of Mothers & Others' mission is to encourage consumers to buy from local retailers, supporting the economy in your area and reducing the environmental costs of long-distance shipping, which expends fossil fuels. Please contact us and tell us about any great resources you find; we can be reached at our toll-free number: 888-ECO-INFO.

And, if you're concerned about preserving what's left of the world's ecosystems, from mountain watersheds to the oceans, for our children and *their* children, this book is most definitely for you. In addition to protecting your baby's home environment, we draw the link between what we consume at home and the impact on our natural resources. Another major part of Mothers & Others' mission is to reduce our consumption of wasteful goods produced through polluting means, and to "vote" with our consumer dollars for organic food and other environmentally sound products. For instance, the lighting section of chapter 2 focuses on energy-efficient, compact fluorescent lightbulbs for baby's room. This part of our mission is implemented through a nationwide Shoppers' Campaign, which organizes individual consumers, manufacturers and growers, wholesalers, and retailers to make greener products more widely available. We hope that, after reading this book, you'll be moved to join Mothers & Others and work with us in our Shoppers' Campaign to effect social change, and protect the environment, through the power of our consumer demand. In the back of the book there's information on how you can send for a free *Green Guide* and also, if you wish, how to join Mothers & Others.

There's one more thing we'd like you, please, to keep in mind as you read: You don't have to do it all! In fact, you shouldn't try to. You should avoid the stress—psychological and physical—of major renovations while pregnant. You can go through this book and choose what seems manageable for you now, and what you might like to do later. Without further ado, then, here's a quick overview on how to use this book.

Part One, "Preparing for the New Arrival," explains how to prepare for your new baby.

Chapter 1, "The Importance of Your Child's First Environment," provides detailed reasons for avoiding environmental toxins, irritants, and allergens in the home.

## Introduction

Chapter 2, “Preparing Baby’s Room,” is a comprehensive treatment of the nursery, from paint and wallpaper and window treatments to carpeting and flooring and lighting, choosing a crib and other nursery furniture, mattresses, and sheets.

Chapter 3 gives a brief overview of other baby equipment, from car seats to playpens and portable cribs to gates and walkers—including the latest consumer information on these sometimes dangerous accessories, and safer alternatives.

Chapter 4 covers babyproofing, nontoxic furnishings and dishes, and an indoor air checkup for the whole household.

Chapter 5 presents an overall systems checklist: a broad and comprehensive sweep to uncover and clean up pollutants in and around your house.

Because a mother’s environmental exposures to contaminants while pregnant can affect the developing fetus, chapter 6 is dedicated to caring for yourself during pregnancy. It provides a number of easy, but highly beneficial, things you can do while pregnant.

Once your baby has arrived, Part Two of *Mothers & Others’ Guide to Natural Baby Care* comes into play.

Chapter 7 gives step-by-step instructions on nontoxic ways to bathe, diaper, dress, and play with your baby.

Chapter 8 focuses upon feeding your baby. *Mothers & Others* encourages breast-feeding, as do most pediatricians nowadays. How to breast-feed, how to pump and store milk, how to bottle-feed, and how to find and make organic baby food are also discussed.

As your baby grows, Chapter 9 will become increasingly relevant. It is aimed at helping you give your children an appreciation of nature.

Finally, Appendix A gives you contact numbers for getting further information from government agencies and other nonprofit organizations. Appendix B identifies companies that sell the products mentioned in this book by mail.

Among *our* resources, in putting together this book, *Mothers & Others* counted upon the talents and expertise of many staff members and friends. Our writers are Mindy Pennybacker, director of *Mothers & Others’* consumer research and education services (CRES), editor of *The Green Guide*, and mother of a twelve-year-old boy, and Aisha Ikramuddin, senior research associate and research editor, who heads the fact-checking department of *The Green Guide* and who thoroughly vetted this book for accuracy. Aisha and Allison Sloan, CRES assistant editor, are the voices who’ll respond to you if you call our *Mothers & Others’* toll-free consumer research services information line. Members get free answers to their questions about environmental toxins and safer products. We listen carefully to our members’ concerns: 25 percent ask about nontoxic home decorating and cleaning materials, providing ideas for *The Green Guide* and for this book.

Along the way, as Aisha and Mindy have asked me to acknowledge,

they've had lots of help. We'd particularly like to thank our medical advisors, Dr. Harvey Karp and Dr. Philip Landrigan, both pediatricians. In addition to his private practice in Los Angeles, Dr. Karp is assistant professor of pediatrics at the University of California at Los Angeles School of Medicine. Dr. Landrigan, director of community and environmental medicine at Mount Sinai School of Medicine in New York, served on the first advisory panel for the EPA Office of Children's Health. He is also the coauthor, with Dr. Herbert Needleman, of *Raising Children Toxic-Free*. All three of these doctors contribute their medical expertise on the editorial advisory board of *The Green Guide*. Scientists Lisa Y. Lefferts, M.S. P.H., and Sandra Steingraber, Ph.D., also generously reviewed our manuscript.

We'd also like to thank Mothers & Others' members Carol Baxter, mother of two girls, and Joanne Camas, mother of three boys, who wrote first-person anecdotes for this book contained in boxes in chapters 1, 2, and 8.

Other first-person stories came from our program director, Betsy Lydon, mother of an eleven-year-old boy and a nine-year-old girl, who's been with us since 1989; and Lane Graves, regional director of Mothers & Others' West Coast office, whose son Angus was born during the writing of this book. As we went to press another staff member, membership coordinator Sylvie Farrell, became pregnant, and was able to update us on the challenges and joys discussed in chapter 6.

We owe our "look" to the talented Alexis Spakoski, our illustrator, whose daughter, Emma, was born soon after these wonderful drawings were completed. *Green Guide* managing editor Kristin Ebbert contributed in-house copyediting and much general support for this book.

Unfailingly supportive, full of useful ideas and good humor, Judith McCarthy, our editor at John Wiley & Sons, Inc., and the mother of a three-year-old boy, provided continual inspiration for this book from the proposal stage through final galleys. She made the writing and editing a fun and collegial process, and we will always be in her debt.

Mothers & Others is still a young organization. We started out as a project of the Natural Resources Defense Council (NRDC), from which we branched out in 1992, becoming our own, independent nonprofit organization. Since then, we've cultivated our growing membership and continued working with consumers, farmers, and retailers. We've helped spur the growth of the organic food industry. The new green mainstream is growing: According to market researchers the Hartman Group, 52 percent of U.S. consumers are open to and willing to buy greener products. Roper Starch's Worldwide 1993 Green Gauge Study classified 55 percent of the U.S. population as green consumers. Mothers & Others' goal is to increase those numbers. We hope that you'll join us!

My children were only five and two when I co-founded Mothers & Others with Meryl Streep, Roberta Willis, and other parents concerned about the effects of industrial pollutants on the environment and on our children's

*Introduction*

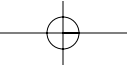
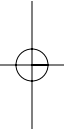
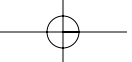
health. We believed, and continue to believe, that the health of our children and of the natural world are inseparable. And as Meryl, the mother of four, exclaimed the other day, while we sat in my office reviewing galleys, "I just wish there'd been a book like this when we were pregnant with our children!" But here, at last, it is: We're very proud to be presenting you with this useful guide on how to make your home environmentally safe for a new young life.

—Wendy Gordon, M.S.  
Executive Director, Mothers & Others for a Livable Planet

PART I

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*Preparing  
for the  
New Arrival*



# The Importance *of* Your Child's First Environment

**W**hen preparing a baby's room in the not-so-older days, we might have slapped on a fresh coat of paint, put down a new carpet, hung new wallpaper and drapes, bought new furniture, bedding, and clothes—and wondered why we felt so rotten afterwards. We'd probably chalk it up to exhaustion, a common side effect of the nesting urge. But nowadays we know better. We've learned that most new decorating and home furnishing products contain chemicals that give off fumes, which can literally be a headache, or worse.

Many of the synthetic chemicals used in common home products, such as solvents and pesticides, are known or suspected carcinogens. Others have been classified as hormone disruptors because they block or mimic the normal workings of reproductive, thyroid, and other hormones in our bodies. Inhaled or ingested by a pregnant woman, these chemicals in some cases can cross the placenta, affecting the child's pre- and postnatal development. Sometimes, chemicals released in the home can irritate the eyes, nose, and throat and trigger allergies and asthma. As a general rule, the more we're exposed to things we're allergic to, the worse our allergies get. One good way to give our children the best possible start in life is to limit their exposure to these substances.

Thus it's wise to know exactly what you are outfitting your nursery with, what the risks are, and whether healthier alternatives exist.

In most cases, they do. And when it comes to environmental factors in children's health, you are far better off preventing problems by maintaining surroundings as toxin-free as possible.

This chapter will acquaint you with some of the risks. The rest of the book will outline simple steps you can take throughout your home to protect your child. At the same time, we certainly don't want you to feel hopeless or unduly alarmed—you shouldn't feel pressured to do *everything* listed in this book.

Even Carol Baxter—a mother of two, and one of the most active, committed members of Mothers & Others—didn't try to do it all. "I did not create a pure non-toxic environment!" Carol says of her daughters' nursery. "We kept some of the plastic toys we got as gifts, and the crib and bed have conventional mattresses," she adds. Despite these minor lapses, Carol did, from the start, take some basic, simple steps to protect her children's environment. But before we look at what she did, let's examine the outfitting of a conventional nursery.

Here's a typical scenario:

An expectant couple—we'll call them Sally and Todd Maple—moves into a brand-new home in a housing development. They don't like the color of the small bedroom, which will become their baby's nursery, so they choose a nice sunny yellow paint. The proud salesman points out that the latex paint contains preservatives and fungicides that will keep it fresh for years to come. The Maples also choose an oil-based white paint for the baseboards, windowframes, sills, and doors. Because Todd is gone for most of the day, including a long commute to his job, and Sally left work at the beginning of her eighth month of pregnancy, she is happy to help out by painting the windows and doors, leaving the walls and ceiling for Todd to do on the weekend.

All the relatives, including both sets of grandparents-to-be, advise the Maples that synthetic carpeting, treated with stain-resistant finishes (to guard against all those baby spit-ups and spills) is the most practical and affordable, and that it should be well-padded to cushion a crawling baby or tumbling toddler. They choose a nice powder blue synthetic carpet and underlay. The carpet store installs the "system," gluing it all securely to the nursery floor.

At last comes the fun part, the furnishings. The Maples go to the baby emporium and choose a wooden crib. "What kind of wood is this exactly? Is it hardwood?" Sally asks the salesman. "No, it's a composite wood, pressed and laminated. Very strong. The bottom is good sturdy particleboard," he adds, lifting up the foam mattress to show her. "Everything's coated with a waterproof finish—crib, mattress—so you don't have to worry about accidents," the salesman concludes with a meaningful look. The upper bar has a sheath of soft plastic on it, to protect the crib from baby's gnawing during the teething stage. The Maples buy the crib, a matching pressed-wood changing table and chest of drawers, and a sturdy particleboard bookshelf and plastic toddler-size table and chairs. It's Todd's idea to buy the vinyl

cartoon-character wallpaper to line the walls around the crib; he can't bear the idea of sticky little fingers ruining his new paint job.

When the furniture arrives, the Maples arrange it in the yellow-and-blue room. They place a fluffy polyester-stuffed quilt and matching overstuffed bumperguards in the crib, and make up the mattress with a fitted permanent-press sheet. On the changing table shelves they stack disposable diapers and many of the baby shower gifts, including hooded cotton towels and extra receiving blankets and comforters. Into the bureau they tuck the polyester terry knit, flameproofed pyjamas, the fleece creepers, and cotton and cotton-blend baby undershirts. They put the new books, including some cute vinyl bath books, on the shelves, along with plastic and stuffed toys.

After all the accessories have been neatly arranged, Todd has a surprise gift for Sally: an antique walnut rocking chair. With a cry of joy, she sits down immediately and puts her feet up on the child's table.

"I'm tired. And I have a headache. But I'm happy. We have made a beautiful nursery," she says.

"Not as beautiful as you," says Todd, his eyes watering—from emotion, he's almost sure, though it feels curiously like a hay fever attack. But this is winter, so there is no pollen for him to react to. He experiences two urges: to open a window and to smoke a cigarette. But he doesn't want to let in cold air, and he knows better than to smoke in the baby's room. He puts his hands on the back of the rocker and rocks Sally gently. In a little while, he'll smoke his cigarette in the living room, the one and only designated smoking room in the house.

What's wrong with this cozy scene?

First, a pregnant woman should avoid exposure to cigarette smoke, which enters the bloodstream from the lungs and crosses the placenta to affect the fetus. One clear example of prenatal harm is low birth weights of infants whose mothers either smoked during pregnancy or were passively exposed to secondary smoke. To protect a newborn's health, the family home and car should be made into completely smoke-free environments long before baby arrives—ideally, as soon as the couple decides to try for a pregnancy.

Next: Don't do any renovations while you're pregnant! You should never do any of the painting yourself; nor should you ever be present during the painting or the installation of carpets. This is because toxins ingested or inhaled by a pregnant woman readily cross the placenta, exposing the fetus to possible harm.

What could possibly be toxic about adorable baby accessories and such fixtures of daily life as a new carpet and a coat of fresh paint? Consider how too much of even a good thing can be smothering, and then think of the cumulative effect of a lot of not-so-good things. Sure, baby needs soft surroundings and warmth, but those overstuffed comforters and crib bumpers and the wall-to-wall carpet provide havens for dust mites, one of the most potent allergens known. And almost all of the synthetic decorating materials the Maples used, from paints to carpets to furniture, emit potentially dangerous fumes. So do many of the fabric finishes on the

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bedding and baby clothes, and the stain-resistant treatment on that carpet. Most powerful when new, the emissions from all these new products in the small, contained space of a nursery blend into a toxic atmosphere.

The principal culprits are volatile organic compounds, or VOCs, whose defining characteristic is that they contain carbon. They also evaporate faster than water—gasoline is a familiar example. VOCs readily evaporate as gaseous fumes into the air from paints, varnishes, cleaning products, glues, carpets, and many other products found in most homes today. This process is also referred to as “off-gassing.” VOCs occur most commonly in petrochemical-derived products, such as plastics and pesticides. Adverse health effects from exposure to many of the chemicals used in these products can range from allergic reactions, such as Todd Maple’s itchy, watery eyes, to breathing difficulty, nerve damage and, in the long term and at high exposures, even cancer.

Cigarette smoke, for instance, contains a number of VOCs in its mixture of more than 4,000 chemicals. One of the worst is formaldehyde, a VOC ranked as a probable human carcinogen by the U.S. Environmental Protection Agency (EPA). Formaldehyde is also contained in, and offgasses from, such commonplace objects as pressed wood and glues, or bonding agents. The fiberboard used in the Maples’ crib and changing table is a pressed wood; so is the particleboard used in the shelving they chose. Permanent-press finishes on fabrics, such as the no-iron crib sheets and the curtains, also can release formaldehyde. Formaldehyde also can be found in many paints. Health effects of exposure to formaldehyde vapors can include eye, nose, and throat irritation; coughing; skin rashes; headaches; dizziness; vomiting; fatigue; and nosebleeds, according to the American Lung Association (ALA).

As for the carpet, while most new systems do not contain formaldehyde, they do contain other toxic VOCs. And, as the ALA’s Indoor Air Pollution Fact Sheet points out, “. . . carpets can trap formaldehyde emitted by other products in homes and then slowly release it thereafter.” Some of the preservatives, fungicides, and solvents in the paint the Maples bought are toxic VOCs, too.

Finally, winter or summer, Todd should have opened that window—wide! Ventilation is crucial, because most modern homes are tightly sealed to hold heat in. This is good for conserving energy and dollars, but bad if you’re also holding in dust mites and toxic fumes. Indoor air pollution is a particular problem in today’s energy-efficient homes. Comparative risk studies performed by the U.S. Environmental Protection Agency (EPA) and its Science Advisory Board have consistently ranked indoor air pollution among the top four environmental risks to the public. The agency reports in its 1992 publication, “Targeting Indoor Air Pollution,” that “indoor levels of pollutants may be 2–5 times, and occasionally more than 1,000 times, higher than outdoor levels.” The EPA estimates that most people spend about 90 percent of their time indoors; in the case of a newborn, it’s 95 percent.

Indoor air quality can be dangerously degraded by gasses emanating from all household furnishings, particularly in combination and when they’re new—the typical nursery scenario. In decorating a nursery, just as we concentrate on making everything look harmonious, so should we make sure that it all comes together

in terms of safety. Cumulative safety is the key. Measured on a product-by-product basis, the fumes from particleboard furniture, fresh paint, or synthetic carpeting and glues may not exceed health safety standards on their own. But in combination, these fumes might well cause adverse health effects. All these allergens and toxins, which are heavier than air, settle down into and collect in the carpet. "If truckloads of dust with the same concentration of toxic chemicals as is found in most carpets were deposited outside, these locations would be considered hazardous-waste dumps," wrote Wayne R. Ott and John W. Roberts in the February 1998 issue of *Scientific American*.

But before you read further, please don't panic or feel overwhelmed! Throughout this book, there are a lot of problems and solutions—think of it as a menu you can apply to your own circumstances and needs. As when a child begins to walk, little steps can be transformative. When outfitting a new nursery, it's often just a matter of making different, "greener" choices in items you were already planning to acquire. This will lessen the overall, cumulative effect of chemicals in your home.

Is it really worth the trouble? We strongly believe that it is. The following overview of potential hazards and health problems will show you why.

## ***Why Babies and Children Need Extra Protection***

Our children live in a world vastly different from the one we grew up in even a generation ago. Since World War II, at least 75,000 new synthetic chemical compounds have been developed and released into the environment. Fewer than half of these have been tested for their potential toxicity to humans, and still fewer have been assessed for their particular toxicity to children.

While adults do suffer ill consequences from numerous home products, children are far more at risk than adults. In 1993, the National Academy of Sciences (NAS) and the EPA concluded that, beginning *in utero*, babies and children are different from adults; they are often much more vulnerable in terms of environmental toxins. The government has made it a matter of policy to protect our young ones from harmful substances in the environment. In 1996, in outlining the first "National Agenda to Protect Children's Health from Environmental Threats," the EPA announced that special assessments of chemical risk to our offspring must be undertaken as a matter of urgent national priority.

In 1998, in response to President Clinton's executive order on children's environmental health, the EPA and the Department of Health and Human Services allocated \$10.6 million for new research centers at eight university hospitals nationwide.

### **Why Are Babies and Children More Vulnerable?**

Pound-for-pound, children breathe more air, drink more water, and eat more food than adults. Thus, they are more exposed to air and water pollution and pesticides. For instance, a recent study at the University of North Carolina at Chapel Hill found that children inhaled proportionately more pollution than adults and teenagers

did. Children's bodies grow and develop more rapidly, so chemicals that can harm development can do maximum damage at this critical time. They also play on the floor where allergens, such as dust and heavier-than-air chemicals, settle and collect. Then there's natural behavior: Putting everything in the mouth is a crucial part of normal development—the way a baby learns about the world. Rather than restrain development, it's better to provide a growing child with safe things to chew on.

Further complicating the matter, all these chemicals surround us in combination. And the cumulative effects of exposure to different chemicals, whether in the workplace or home, have simply not been addressed. To remedy this, the EPA has instituted a major change in its policy and approach: When it comes to children's health, in addition to examining and assessing each chemical's effects separately, the EPA will also measure their effects in combination, the way our children are most likely to encounter them. The goal is to examine "a child's total cumulative risk from all exposures to toxic chemicals," according to Carol Browner, EPA Administrator.

Dr. Philip Landrigan, former senior advisor to EPA Administrator Carol Browner on children's health and environment, chairman of Community and Preventative Medicine at the Mount Sinai Medical Center, Mothers & Others medical advisor, and coauthor, with Dr. Herbert Needleman, of the excellent medical guide *Raising Children Toxic Free*, has identified the following as the four most pressing health issues for children:

1. the rise of asthma
2. the rise in childhood cancers
3. endocrine disruptors
4. environmental neurotoxins (lead, mercury, solvents, pesticides)

### The Rise of Asthma

An estimated 4.8 million Americans under age eighteen have asthma, which is also the number one reason for school absenteeism in America. Asthma deaths in children and young adults nearly doubled between 1980 and 1993, according to the Centers for Disease Control and Prevention (CDC).

Dust mites are principal culprits in asthma. Microscopic creatures, they thrive on moisture and the old skin cells we constantly shed. They infest bedding, upholstery, drapery, and rugs, and their excrement is a potent allergen that can trigger asthma attacks. "I ripped up my carpeting when my daughter first was diagnosed with asthma," says Patty Arlotta of the Bronx, New York. Patty says that thanks to bare floors and vigilant medical treatment, her daughter's symptoms have abated. Chapters 2 and 5 will show you how to keep mites out of your child's air without forgoing mattresses, pillows, comforters, and rugs.

Technically an irritant to airways rather than an allergen, cigarette smoke affects asthma sufferers severely. Also harmful are cockroaches, pet danders, mildews and molds, unvented gas appliances, fine airborne particulates, and smog. So are gasses released from vinyl interior materials, such as wall and floor cover-

ings, researchers at the National Institute of Public Health of Norway found in 1997. These are all excellent examples of environmental factors that directly worsen and, in some cases, trigger, this debilitating disease. Throughout this book, we will tell how to reduce these environmental factors in your home.

## The Rise in Childhood Cancers

The rate of cancer among American children younger than fifteen has been steadily rising at a rate of nearly 1 percent a year over the past twenty years, the National Cancer Institute reported in 1997. A child born today has about a 1-in-600 risk of developing cancer by the age of ten. While the death rate from cancer in children has steadily declined, thanks to improved detection and medical treatments, new cases are being diagnosed in ever-increasing numbers and cancer remains the most common form of fatal childhood disease.

“The strong probability exists that environmental factors are playing a role” in the rise of childhood cancer, Dr. Landrigan says. Environmental factors encompass everything from a child’s food and water to the substances her skin comes in contact with and the air she breathes.

One study has found that the risk of childhood leukemia is three to six times greater for children in households using home and garden pesticides. Childhood brain tumors have been strongly associated with the use of household pesticides during pregnancy, particularly pyrethrin- and organophosphate-based flea and tick foggers. In Woburn, Massachusetts, where water was contaminated by industrial solvents and heavy metals, the childhood leukemia rate rose to four times the national average between 1966 and 1986.

Many of the ingredients used in home products such as pesticides, fungicides, and herbicides are known or suspected carcinogens. While, again, you shouldn’t panic and throw out every plank of particleboard in the house, you can easily choose not to use the more dangerous pesticides in your home and garden, and certainly not to buy nursery wall paint laced with fungicides!

## Endocrine Disruptors

Endocrine, or hormone, disruptors are synthetic chemicals that mimic or block the body’s natural hormones, such as estrogen, thus altering the body’s normal hormonal activity. They are suspected to be behind the increasing rates of endometriosis, breast cancer, low sperm counts, early puberty, undescended testicles, and hypospadias, a congenital deformation of the penis. These “hand-me-down” poisons readily cross the placenta. A classic example of a hormone disruptor, the fertility drug diethylstilbestrol (DES), an estrogen mimic, was banned after it was linked to increased infertility and cervical and testicular cancers in the children of women who had taken it. The worldwide dispersal of such known hormone-disrupting chemicals as the pesticides DDT, atrazine, chlordane, chlordecone, and lindane, and industrial byproducts such as dioxins, furans, and some of the polychlorinated biphenyls (PCBs), has effectively been drugging the environment for at least a generation. PCBs, oily compounds used for decades to insulate electrical equipment and now banned, remain in the bottom mud and banks of many waterways, from

the Great Lakes to the Hudson River. PCBs, dioxin, and DDT rise in the food chain, accumulating in the fat of living creatures, such as fish and also humans. Most of us, certainly in the industrialized world, have these chemicals in our bodies. While few human studies have been conducted until now, the EPA's new agenda sets a high priority on evaluating hormone disruptors. The long-term effects on wildlife—from sterility in Florida's bald eagles to shrunken penises in alligators in contaminated waterways—have been collected in the groundbreaking book *Our Stolen Future* by Theo Colborn, J. P. Myers, and Dianne Dumanoski. What appears to be a worldwide decline in human sperm counts over the past fifty years has been tentatively linked to these chemicals, most of which did not exist until after World War II.

Babies can be exposed to hormone disruptors in four basic ways:

- through food;
- through prenatal exposures;
- through chemicals inhaled along with the air they breathe; and
- through other activities that put them in direct contact with toxins, such as putting objects in their mouths or crawling on or touching contaminated surfaces.

What's wrong with that soft vinyl teething shield on the Maples' crib? Phthalates, a class of chemicals used to soften vinyl so it can be made into teething rings, shower curtains, and other soft products, and another possible additive called nonylphenyl ethoxylate, may interfere with the human hormone system. Some phthalates are suspected to be carcinogenic. Phthalates are not permanently bonded to the plastic structure of PVC and can migrate to the surface of the plastic and offgas. In a Norwegian National Institute of Health study, exposure to phthalates in vinyl interior surfaces was shown to increase the risk of developing bronchial obstruction and asthma in the first two years of life. Phthalates were found to have offgassed from the plastic to become attached to house dusts and small air-borne particles, which are readily inhaled.

True, you'll say, but plastic surrounds us. And we agree that you shouldn't feel compelled to dispose of all the plastic in your life. As a guiding principle, simply be aware that these are chemicals found in plastics in the household, including pacifiers and toys—and so, when it comes to plastics, less is better than more. You can make the choice not to acquire more vinyl, particularly in home furnishing products where substitutes, such as wood and natural fibers, are readily available.

### **Environmental Neurotoxins (lead, mercury, solvents, pesticides)**

Neurotoxins, which include PCBs, affect the nervous system and brain development.

Lead, a heavy metal, is probably the most dangerous neurotoxin that children and pregnant women can encounter in everyday life. In 1978, lead was limited in interior house paints to 0.06 percent by weight, a level that eliminates lead poison-

ing dangers from paint. However, the primary exposure to lead comes from old lead-based paint remaining in layers on walls. Simple but frequent activities, such as opening a window or door, can create enough lead dust to harm a child. Though lead was phased out from gasoline beginning in 1979, it has settled from the air into the soil, where it remains a menace to young children.

And it isn't just a full-blown case of lead poisoning that can derail a child's growth. Lead's effects on intellect and development, even at low levels, can be tragically permanent. "It's now clear that lead in low levels can affect a child's ability to pay attention and avoid distractibility," says Dr. Herbert Needleman, a professor at the University of Pittsburgh Medical Center and leading researcher on the effects of lead exposure in children. Lead in higher levels correlates with antisocial behavior, aggression, learning disabilities, impaired hearing, and lowered I.Q. Though lead levels in children have dropped dramatically since its banning in gas and paint, still, according to the CDC, 4.4 percent of American children under the age of six have blood lead levels above the safety threshold of ten micrograms per deciliter (10 mcg/dl). More than 900,000 children in the United States have been exposed to lead levels that exceed the CDC's safety threshold.

Mercury, found in some batteries, thermometers, paints, and some fish, such as swordfish, is another heavy metal and neurotoxin. Elemental mercury causes numbness, memory problems, movement and speech problems, and tremors. Methylmercury, which accumulates in fish and crosses the placenta, can cause brain damage and birth defects as it did to the infants of Minamata, Japan, in the 1950s.

Organophosphate pesticides, another group of dangerous neurotoxins, are widely used in conventional agriculture, in homes, on gardens and lawns, and by municipalities battling mosquitoes. More than one million infants and children under five years old are exposed to potentially unsafe doses of these pesticides in their food, according to a January 1998 report called *Overexposed: Organophosphate Insecticides in Children's Food* by the Environmental Working Group (EWG). For more information on the problem of pesticides in food, see chapters 6 and 8.

## *Some Dangerous Chemicals Found in Most Homes*

Most homes today contain hundreds of chemicals. Some, such as cleaners, pesticides, and building supplies, are deliberately brought inside. Others enter homes as a result of environmental pollution. These are the most serious environmental contaminants.

### **Dioxins**

Dioxins are both potent carcinogens and hormone disruptors, and they provide a prime example of why less plastic is better than more. They cause cancer at levels far below those of any other known carcinogen. Possibly the most toxic man-made substances known, dioxins are primarily released into the air in the production and incineration of polyvinyl chloride (PVC), known to us as vinyl.

Dioxins are also released during the chlorine bleaching of paper, the incineration

of municipal and medical waste, and the manufacture of organochlorine herbicides and some household cleaners. From the air, dioxins settle into our water and soil, from which they enter the food chain and finally concentrate in the fatty tissues of animals and human beings. Human infants, at the top of the food chain, absorb dioxins across the placenta and through their mothers' milk. Sixty percent of the 10 billion pounds of PVC produced annually in the United States goes into home construction and decoration: in water, gas, and sewage pipes; window frames; doors; venetian blinds; shower curtains; imitation leather; furniture; and wallpaper. Sixty-six percent of American kitchens have vinyl flooring. It is also used in disposable medical supplies, from bedpans to IV tubing and syringes. Some water bottles and other plastic bottles are made with PVC (look for the triangular recycling symbol with the number 3). While we are not exposed to dioxin from PVC plastic in our homes, we should try not to buy it, as its manufacture and burning release dioxins into the environment. In addition, many PVC home products contain and release some toxins, such as phthalates and lead.

### Volatile Organic Compounds (VOCs)

The pesticide chlorpyrifos is an example of a chemical that can vaporize and contaminate objects in a home. One obvious way such VOCs enter the air very readily is through spray applications, whether of paint, pesticides, foam insulation, or room fresheners. But VOCs don't have to be sprayed to enter the air. Fumes can rise from a stable-looking substance like a particleboard shelf or a synthetic carpet or any item held together by glues, for months on end.

As listed in *Raising Children Toxic Free*, by Drs. Landrigan and Needleman, some of the more toxic VOCs all too commonly found in conventional home furnishings (and in household air) include:

- *Benzene*, a solvent and known cause of leukemia and lymphoma, is present in some furniture and carpet glues, epoxies, and unleaded gasoline. It can be absorbed through the skin or by inhalation.
- *Formaldehyde*, an irritating gas and a probable carcinogen, has been implicated as a cause of cancers of the lungs and nasal sinuses. Formaldehyde gas may emanate from the glues in new plywood or particleboard furniture and cabinetry; some carpeting and other floor-covering systems (in glues, adhesives, and underlays as well as in the actual rug fibers or synthetic linoleum tiles); wallpaper; curtains; and certain fabric finishes, such as stain- and moth-proofing. As mentioned earlier, formaldehyde is also present in some paints, stains, and wood finishes, as well as in tobacco smoke.

Between 10 and 30 percent of the population may be sensitive to formaldehyde, but the actual health effects vary widely among individuals. At low levels, formaldehyde can cause headaches and irritation to skin and mucous membranes in the nose, eyes, and throat. Higher concentrations may result in dizziness, coughing, and constriction of the chest, and can trigger asthma attacks. The EPA also estimates that ". . . 10 to 20 percent of the U.S. population, including asthmatics, may have hyperreactive airways which may make

them more susceptible to formaldehyde's effects." Formaldehyde is considered a probable human carcinogen by the EPA because it has been found to cause nasal cancer in rats and mice.

- *Styrenes* and *toluene* are solvents, present in airplane glue and some quick-drying paints, that are known neurotoxins. "Nearly all solvents can cause acute and chronic injury to the central nervous system," Drs. Landrigan and Needleman say.
- *Perchloroethylene*, the dry-cleaning solvent, has been found to be a neurotoxin as well as a cause of liver cancer. It has also been linked to bladder cancer in both occupational and epidemiological studies.

This book is dedicated to helping you take the best possible care of your baby by choosing less toxic products for your child's first environment. Have we convinced you that it's worth the trouble? Here's one more example: Babies and children touch everything in a room as they learn about the world. But what they touch can carry toxins that might be absorbed into their skin. Children may also ingest toxins by putting their hands into their mouths after touching a contaminated object or dust. A Rutgers University study showed how children can accumulate significant amounts of hazardous chemicals in their bodies simply by playing in a room after a pesticide fogger has been used there. The study found that children were significantly exposed, through their touching and handling of contaminated toys and other objects in a room, even as much as a week after spraying. The scientists found that vapors and residues from the pesticide chlorpyrifos, commonly used indoors against fleas and marketed under the names Dursban and Lorsban, were absorbed by both plush and plastic toys that were placed in rooms an hour after the areas had been sprayed.

In addition to choices that are healthier for your family, we also present you with choices that are sounder for the natural environment. Ultimately, a healthier natural environment is good for our health—individually and as a species.

## Nursery Ecology

Beyond your concern for baby's immediate environment, there are global environmental considerations that all parents, as citizens of Earth, might want to consider in making product and decorating choices. By making a conscious choice not to buy petroleum-based products, consumers help preserve both the oil itself and the pristine areas, such as the Alaska wildlife refuges, imperiled by drilling and spills. By taking care not to select products made of tropical hardwoods, such as mahogany, we help protect the forests that are threatened worldwide. The burning and cutting of forests contributes 25 percent of all atmospheric carbon dioxide, a major greenhouse gas resulting from human activities, each year. In addition to its effects on your child's health, also consider the impact of how a product is made. The production of vinyl, or PVC plastic, for example, releases dioxins. And finally, what is the life cycle of a product? For instance, how does one ultimately dispose of a synthetic wall-to-wall carpet? Landfills are layered with such useless things.

## My Mostly Natural Nursery by Carol Baxter, *Mothers & Others* member

Creating a nursery for my first baby was very exciting for my husband and me. Making it adorable, of course, was one of our goals, but making it as environmentally “clean” as possible was also of utmost importance to me. Since my infant had spent nine months *in utero*, the ultimate protected environment, I wanted to do all I could to create a natural environment and one that was environmentally responsible, free of chemicals, known allergens, and manmade synthetics.

Starting with the small, empty room, I was lucky to have a wood floor in beautiful condition. I tested the paint, especially on the window sills, for lead. The results, to my relief, came back negative.

Choosing wood furniture (crib, diaper table, rocking chair, and book shelf) was easy, but when it came to the mattress, I was at a loss. I was discouraged by the fact that every infant mattress I found was covered with vinyl. I was disappointed, but I finally went ahead and bought one because I didn't see any alternative. Most people like vinyl because it is practical since it cleans easily. But vinyl, a plastic, is made from petroleum, a nonrenewable resource, and its manufacture and disposal, when burned in incinerators, releases dangerous dioxins. New vinyl, like any plastic, offgasses VOCs into the air, so before I used the mattress, I made sure to leave it out in a well-ventilated area for a few weeks so that that process could take place long before my baby came to lie on it.

Painting was the next big issue. My original vision of the nursery was a rain forest theme, with a mural of monkeys, red-footed tree frogs, and toucans frolicking in a lush green overgrowth. But my baby, Lily, had received two beautiful, handmade cotton quilts, both pink. They belonged on the wall, and they wouldn't go with the rain forest scheme. I decided to use a solid pink color, but now I had to choose the paint.

I was aware that lead had been banned from paint for over twenty years; however, I also know that conventional paints still contain toxic VOCs, which offgas for a long time. I didn't want this. So, after weeks of research, I found Livos, a company in New Mexico, that makes paint free of VOCs. I chose a cheery pale pink, far from my first choice, but it ultimately turned the room into a lovely place to be. This nontoxic paint was exorbitantly expensive, \$50 a gallon, but it was important to me. With each stroke I was reminded of its price, and I remember thinking that if I wanted to raise my daughter in an ecologically safe environment, it might be at a cost.

This was just the beginning of what I call “shift spending,” going without one thing so that I can pay a little more for something that's important. Ultimately I remain within budget, while increasing the quality of life: my own, my family's, and the planet's.

Walls freshly painted and white cotton curtains with pink polka-dots hung, we now awaited the delivery of the furniture. I gave the floors a thorough cleaning with Murphy's Oil Soap before laying down a freshly cleaned, colorful antique wool throw rug.

Putting the nursery together, after the furniture arrived, was easy. I filled the bookcase with Lily's new books and wood and cotton toys. I opted to keep plastic toys out of her nursery because they, too, offgas. Her bed was made with 100 percent organic cotton mattress pads, bumper pads, sheets, and blankets. For the comforter, I made a pink-and-white-striped cotton cover. I put cotton diapers and clothing on the shelves, and toiletries made of natural ingredients on her dressing table. I stepped back and thought, “How adorable and crisp this room looks.” I loved it.

It is years since I created that first nursery. Today costs have come down and selections have increased. For example, you can now purchase VOC-free paint, less expensively, at most paint stores. And you don't have to settle for a mass-produced vinyl mattress

because cotton futons are now made for cribs.

The most important thing that impressed me when making the nursery was that my choices in making it eco-friendly were not bizarre. Natural fibers were the only thing available in our society two generations ago. My choices echo a simpler time. And I'm always pleased with the results.

If you read the story in the box, you may have noticed that Carol Baxter, because she didn't know better at the time, broke a prime rule and painted her baby's room herself, while pregnant. At least she used nontoxic paint! Happily, both the baby she was carrying then, and her next child turned out perfectly fine. If you have also already painted or done other renovations while pregnant, don't worry! Just take sensible precautions from now on to reduce cumulative exposure to all these risks for yourself and your baby. This includes making sure that you have not disturbed and been exposed to old lead paint during your renovation, as discussed in chapter 2. Carol made many healthy environmental choices, and doing this made her happy and calm—a very healthy state to be in.

While Carol didn't stress herself out by creating a perfectly nontoxic nursery, she did take some basic commonsense steps to protect her children's environment *and* the environment at large. Rather than wall-to-wall synthetic carpeting, the Baxter nursery has all wood floors with just a couple of washable cotton and wool throw rugs. Rather than plastic, so ubiquitous in children's furnishings, all the furniture, including bed and crib, is made of real wood. Except for certain gifts, the bedding and toys are all cotton or wood. Already, Carol has reduced her family's consumption of petroleum-based products (plastics, synthetic fibers, and carpet glues); this helps preserve the environment at large, since petroleum is a nonrenewable natural resource. She has also reduced her family's exposure to irritating and toxic VOCs.

Plus, Carol's bare floors and throw rugs radically reduce the habitat of dust mites that teem and multiply in wall-to-wall carpet, which can't be taken up for a thorough wash. When it comes to floor washing, although Murphy's Oil Soap contains natural pine oil, it also has TEA (triethanolamine), which can form carcinogenic nitrosamines. Carol would be better off using a least-toxic, all-purpose cleaner such as Ecover.

If the wood Carol selected had been eco-certified, and the rugs bore the "no child labor" tag, so much the better. But products with these labels didn't hit the general marketplace until after her children were born, and to this day, savvy consumers still have to ask for them.

*Preparing for  
the New  
Arrival*

But also, as Carol Baxter's story amply demonstrates, there is room for joyful, creative nursery design: Less toxic, nonirritating alternatives are available in a wide variety of sizes, shapes, and colors. And, like Carol, you don't have to do it all. As you read on, please remember that our message is one of hope. You can take charge of your baby's environment and make a difference in his or her health while still creating a beautiful nursery. Your less-polluting choices will also help protect our common environment, the natural world.